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Forest Insect and Disease Conditions Intermountain Region 1976

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COVER STORY

The Forest Insect and Disease Biological Evaluation Center, completed in late 1976, provides offices, a laboratory and greenhouse for the Ogden Zone Insect and Disease Control staff. Construction was completed through a cooperative program with the Weber Basin Job Corp. The center is located at 4746 S. 1900 E., Ogden, Utah 84403.

FOREST INSECT AND DISEASE CONDITIONS

INTERMOUNTAIN REGION

1976

Compiled by:

M. Moyer

Major Contributors:

D. Curtis, Entomologist
K. Gibson, Entomologist
J. Knopf, Entomologist
M. Ollieu, Entomologist
L. Stipe, Entomologist
A. Valcarce, Entomologist
A. Tegethoff, Pathologist

Forest Insect and Disease Control

State and Private Forestry

USDA-Forest Service

324 25th Street

Ogden, Utah 84401

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RESUMÉ OF CONDITIONS

Bark beetle activity continued throughout the Intermountain States in 1976. Mountain pine beetle-caused mortality decreased Regionwide, but increased locally on portions of the Targhee National Forest, Idaho, and the Ashley National Forest, Utah.

Douglas-fir beetle-caused tree mortality increased on the Boise, Salmon, and Sawtooth National Forests in Idaho. Fir engraver beetle activity associated with logging was observed on the Boise and Payette National Forests in Idaho. Western pine beetle mortality in second-growth ponderosa pine occurred on the Boise National Forest, Idaho.

Western spruce budworm infestations in Idaho and Wyoming have increased both in size and intensity. New defoliation was recorded in Douglas-fir and true fir stands on portions of the Boise and Payette National Forests in Idaho and on the Bridger-Teton National Forest in Wyoming.

Douglas-fir tussock moth populations caused light to moderate defoliation in Douglas-fir and subalpine fir stands in Owyhee County, Idaho.

Western tussock moth activity caused defoliation of *Ceanothus* and other broadleaf species on the Boise National Forest, Idaho.

The forest disease situation is little changed from 1975. The most important forest diseases in the Intermountain Region are the decays, root rots, and the dwarf mistletoes. These take a large yearly toll, yet go mostly unnoticed.

ENTOMOLOGY

Bark Beetles

Mountain pine beetle, *Dendroctonus ponderosae* Hopkins

Lodgepole Pine

The mountain pine beetle remained the most damaging insect in the Region during 1976. The overall trend of the insect throughout the Region has been decreasing for the past few years; however, several areas are still experiencing heavy mortality.

The largest and most damaging infestation is located on the northern portion of the Targhee National Forest, Idaho. In the Island Park area the number of new attacks per acre increased from 20 in 1975 to 30 in 1976, and near Sawtell Peak the increase was from 10 to 20. On the Moose Creek Plateau mortality continues but at a

much lower rate. Extensive timber harvesting in this area has utilized much of the threatened timber.

A preventive spray pilot study was conducted in stands along the lower Sawtell Peak road on the Targhee National Forest in 1976. This study was essentially the same as was done in 1975 except that water-formulated chemicals were used rather than oil. Lindane, carbaryl (Sevimol-4), and Dursban, were tested at a 2 percent concentration by weight. The study included applying an average of two gallons of each chemical on 100 lodgepole pine trees to a height of 25 feet (Figure 1).

Figure 1. Insecticides were applied to tree boles to point of runoff. Preventive spray pilot test, Sawtell Peak Road, Targhee National Forest.

Preliminary results indicate a protection level ranging from 23 to 98 percent for Dursban and Sevimol-4, respectively. Lindane provided 76 percent protection. Additional tests are being considered for 1977.

Increased bark beetle activity occurred on the Ashley National Forest, Utah. A marked increase in 1976 new attacks was recorded in lodgepole pine type at several locations east of Charlies Park and in the vicinity of Red Cloud Loop north of Vernal.

Tree mortality in lodgepole pine on the Cassia Division, Sawtooth National Forest, Idaho, has decreased within the 22,000 acres of host type — 4.4 million board feet in 1976 as compared to 20 million in 1975. Of the 384 million board feet of standing lodgepole, an estimated 119 million has been killed. Elsewhere on the Sawtooth National Forest lodgepole pine mortality caused by mountain pine beetle was recorded as follows: (1) 4,500 trees on the Albion Division, (2) 10,000 trees along the upper South Fork of the Boise River, and (3) 5,000 trees in the Big Wood River drainage north and west of Ketchum. The Payette National Forest, Idaho, showed 10,000 lodgepole faders in the Johnson Creek Park and Paddy Flat areas.

Since 1960 mountain pine beetle has caused tree mortality from McCall to Cascade involving 70,000 lodgepole and 12,000 ponderosa pine. The Boise National Forest, Idaho, has shown mortality in mature to overmature lodgepole pine along the North Fork of the Boise River and around the town of Atlanta.

Elsewhere in the Region, mortality of lodgepole pine by mountain pine beetle was recorded on the Caribou National Forest, Idaho and the Bridger-Teton National Forest, Wyoming.

Ponderosa Pine

Mortality in second-growth ponderosa pine stands caused by mountain pine beetle occurred on the Dixie National Forest in Utah. The largest infestations were recorded in the Table Cliff area near Pine Lake, in Water Canyon and Cherry Hollow near Green Guard Station, and throughout the Aquarius Plateau from North Creek to Bear Creek. Accelerated tree killing occurred at several locations in the vicinity of Greendale Junction on the west side of Flaming Gorge, Ashley National Forest, Utah.

Jeffrey Pine Beetle *Dendroctonus jeffreyi* Hopkins

Mortality of Jeffrey pine continued in many widely scattered locations on the Toiyabe National Forest, Nevada and California. Heaviest concentrations occurred south of Lake Tahoe in the Grovers Hot Springs and Markleeville areas and in the East Fork of the Carson River.

Douglas-fir Beetle, *Dendroctonus pseudotsugae* Hopkins

Douglas-fir beetle-caused tree mortality was recorded on all Region 4 National Forests in Idaho and Wyoming during 1976. The heaviest infestation occurred along the South Fork of the Payette River in the Boise National Forest from Lowman to Grandjean. Tree mortality on the Sawtooth National Forest increased on the Fairfield Ranger District from Featherville to Big Smokey Guard Station. Heavy mortality occurred in portions of the Big Water Creek, Little Water Creek and Willow Creek drainages that had been defoliated by the Douglas-fir tussock moth in 1973 and 1974. Salmon National Forest, Idaho, showed continued Douglas-fir mortality along the main Salmon River and its drainages, particularly Panther Creek. Mortality on the Challis National Forest, Idaho, was recorded along the Salmon River from Stanley to Clayton. The Payette National Forest infestation on the Council Ranger District remained static to decreasing. Scattered mortality occurred throughout the Targhee National Forest, Idaho, from the Montana-Idaho border south to Alpine Junction. On the Bridger-Teton National Forest, fading Douglas-fir trees were visible from the Jackson Hole ski area south for 12 miles to Mosquito Creek. Elsewhere in the Region activity decreased.

Western Pine Beetle, *Dendroctonus brevicomis* (LeConte)

Western pine beetle infestations in second-growth ponderosa pine stands continued on portions of the Boise and Payette National Forests. The heaviest damage occurred in overstocked pole to young sawtimber stands in the vicinity of Sagehen Reservoir on the Emmett Ranger District, Boise National Forest. Basal area measurements within the ponderosa mortality groups near Sagehen Reservoir averaged 276 square feet per acre. The average green basal area for the area was 165 square feet per acre.

Spruce Beetle, *Dendroctonus rufipennis* (Kirby)

Spruce beetle continued at a very low level throughout the Intermountain Region last year. The heaviest mortality recorded was in Huntington Canyon on the Manti-LaSal National Forest in Utah. Ground surveys indicate that populations are declining following a recent outbreak in this area.

Pine Engraver Beetle, *Ips pini* (Say)

Pine engraver-caused mortality was again observed in an area east of Bogus Basin which has had chronic *Ips* infestations for the past six years.

Elsewhere, *Ips* caused scattered ponderosa pine mortality in a burned area on the Emmett Ranger District, Boise National Forest. Activity was also recorded in several timber sale areas on the Payette and Boise National Forests. Small mortality groups of ponderosa pine occurred over 40 acres of precommercial thinning in the Town Creek Plantation, Idaho City Ranger District, Boise National Forest (Figure 2).

Figure 2. Ponderosa pine killed by pine engraver beetles, Town Creek Plantation, Idaho City Ranger District, Boise National Forest.

Defoliators

Western Spruce Budworm, *Choristoneura occidentalis* Freeman

Defoliation caused by the western spruce budworm was recorded on over one million acres of Douglas-fir and true fir type in Idaho and Wyoming during the 1976 aerial surveys. In Idaho the majority of the defoliation, including the oldest and heaviest concentrations of damage, occurred on the Payette, Boise, Salmon and Challis National Forests. Defoliation on the Payette National Forest, totaling about 810,000 acres, increased in the South Fork of the Salmon River, in areas west of Cascade Reservoir, and in

the Boulder Creek drainage northwest of McCall, Idaho (Figure 3). The Brundage Mountain area north of McCall was defoliated again in 1976. Light to heavy defoliation on the Boise National Forest extends below Sagehen Reservoir and was recorded for the first time in areas southeast of Cascade Reservoir. Defoliation on the Salmon National Forest occurred in the upper Yellow Jacket drainage and in Shovel Creek. A breakdown by defoliation intensity of western spruce budworm infestations in the Intermountain Region is shown in Table 1.

Light to heavy defoliation, amounting to about 40,000 acres, occurred at three locations on the Targhee National Forest in Idaho and Wyoming. This included approximately 22,000 acres of Douglas-fir type on the south slopes of the Centennial Mountains near Spencer, Idaho; 5,300 acres of Douglas-fir and subalpine fir type along the west side of Henrys Lake extending from Raynolds Pass south to Squaw Pass; and 12,000 acres of mixed type in the Snake River Canyon extending eastward from Ferry Peak to Wolf Mountain.

Figure 3. Grand fir defoliated and top-killed by western spruce budworm, McCall Ranger District, Payette National Forest.

DEFOLIATION INTENSITY (ACRES)

FOREST	LIGHT	MEDIUM	HEAVY	TOTAL
Boise	34,600	23,000	32,700	90,300
Bridger-Teton	41,000	65,400	3,800	110,200
Salmon	1,300	-	-	1,300
Payette	170,200	111,300	140,900	422,400 /1
Targhee	18,000	13,300	9,900	41,200
Total	265,100	213,000	187,300	665,400

TABLE 1. Areas of visible western spruce budworm defoliation in the Intermountain Region during 1976 as determined by aerial surveys.

/1 An additional 387,600 acres of budworm defoliation occurred in the Idaho Primitive Area portion of the Payette National Forest. Defoliation intensities were not mapped in during 1976 aerial detection flights.

Defoliation on the Bridger-Teton National Forest, amounting to about 110,200 acres, increased in both extent and intensity this year. Current infestation centers include a 59,000-acre area extending from the Jackson Hole Elk Refuge south 25 miles to the headwaters of Willow Creek and portions of the lower Hoback, lower Greys and most of the Little Greys drainages encompassing about 53,000 acres.

During the spring of 1976 the weather was considerably cooler and wetter than normal. This condition probably had some adverse affect on larval survival. However, the results of the 1976 egg mass survey indicate that populations will be high enough to cause light to heavy defoliation in most areas again in 1977.

The results of stand evaluations on the Boise, Payette, Targhee, and Bridger-Teton National Forests and State of Idaho lands indicate that no mortality of overstory trees has yet occurred. Evaluation of stands near McCall, Idaho showed top kill to be present in 34 percent of the trees >5" dbh. Radial growth loss in grand fir >5" dbh was 16 percent or 42 bd. ft. per acre per year. Grand fir and subalpine fir suffered the most damage.

Table 2 depicts budworm activity for the past 13 years in Region 4 forests.

DEFOLIATION INTENSITY (ACRES)

YEAR	LIGHT	MEDIUM	HEAVY	TOTAL
1964	266,000	658,000	1,352,000	2,276,000
1965	465,600	254,500	795,200	1,515,300
1966	923,900	52,200	16,100	992,200
1967	162,200	54,900	1,600	218,700
1968	333,500	150,200	21,800	505,500
1969	388,800	125,400	30,200	544,400
1970	223,200	79,300	5,200	307,700
1971	229,300	110,300	34,300	373,900
1972	395,300	100,700	9,500	505,500
1973	99,700	76,400	48,000	224,100
1974	234,900	111,300	11,600	357,800
1975	568,800	130,900	33,700	733,400
1976	265,100	213,000	187,300	665,400 [1]

TABLE 2. Area of visible defoliation by the western spruce budworm in the Intermountain Region during the past 13 years as determined by aerial surveys.

[1] Does not include an additional 387,600 acres in the Idaho Primitive Area

Douglas-fir Tussock Moth, *Orgyia pseudotsugata* McDunnough

Light to moderate defoliation of Douglas-fir and subalpine fir was observed on about 10,000 acres of mixed ownership in the Boulder Creek, Sinker Creek, and Jordan Creek drainages, Owyhee County, Idaho (Figure 4).

Figure 4. Douglas-fir defoliated by Douglas-fir tussock moth, Owyhee Mountains, Idaho.

Ground sampling in early July revealed a high incidence of polyhedrosis virus in larval populations. The results of a fall egg mass survey indicate that larval populations will be low in 1977.

Use of the Douglas-fir tussock moth sex attractant to determine the geographic distribution of the insect in the Intermountain Region in 1976 resulted in the detection of male moths from 22 of 43 trapping sites on 12 National Forests. Forests on which one or more moths were detected include the Boise, Challis, Payette, Sawtooth and Targhee National Forests in Idaho and the Manti-LaSal, Uinta and Wasatch National Forests in Utah. Additional trapping will again be done in 1977 to more fully determine the distribution of this forest defoliator in Region 4.

Western Tussock Moth, *Orygia vetusta gulosa* (Hy. Edwards)

Defoliation of *Ceanothus* and other broad leaf species by western tussock moth occurred on the Idaho City and Lowman Ranger Districts, Boise National Forest. Defoliation of ponderosa saplings was observed in a ponderosa plantation which contained infested *Ceanothus* ground cover.

White Fir Needle Miner, *Epinotia meritana* Heinrich

Light to heavy defoliation of white fir occurred over approximately 3,400 acres in several locations on the Dixie National Forest adjacent to Bryce Canyon National Park along the East Fork of the Sevier River. The trend of this infestation is unknown.

Fall Cankerworm, *Alsophila pometaria* (Harris)

Moderate to heavy defoliation caused by the fall cankerworm has again been reported in lower Corn Creek, Fishlake National Forest, Utah and along the Wasatch Front between Ogden and Salt Lake City, Utah. The heaviest defoliation is occurring on box elder and gambel oak with only light to moderate defoliation on big tooth maple and chokecherry. No permanent damage has been observed following three years of consecutive defoliation in either area. The trend of these outbreaks is unknown.

Other Insects

Black Pine-Leaf Scale, *Nuculaspis californicus* Coleman

A 400-acre ponderosa pine stand on private land near Genoa, Nevada continued to be heavily infested for the third year. Repeated infestation has resulted in scattered tree mortality and numerous top and branch killing of individual trees. The results of population monitoring in May-July of 1976 indicate a recovery in parasite populations following the termination of a malathion mosquito abatement program. Population sampling will be done again in the spring of 1977 to determine parasite populations and host tree recovery. A growth impact evaluation will also be initiated at that time.

PATHOLOGY

Dwarf mistletoe, *Arceuthobium* spp.

Lodgepole pine was surveyed for dwarf mistletoe infection on the Twin Falls Ranger District, Sawtooth National Forest. Dwarf mistletoe infected 73 percent of the 665 green trees on the 91 plots examined. Average infection on the Hawksworth scale was 2.41.

A suppression project to control dwarf mistletoe in ponderosa pine on Charter Mountain, on the Emmett Ranger District, Boise National Forest, was completed in 1976. The final phase consisted of selling the merchantable infected pine and felling, lopping, and scattering unmerchantable infected trees.

Suppression of dwarf mistletoe infection through infected overstory tree removal and sanitation thinning of advanced regeneration is expected to increase throughout the Intermountain Region.

Broom Rust on Subalpine Fir, *Melampsorella caryophyllacearum* Schroet

A survey of subalpine fir on the Twin Falls Ranger District, Sawtooth National Forest, showed 100 percent infection by broom rust, *M. caryophyllacearum*. The dwarf mistletoe rating system was adapted to use for rating broom rust infection. Twenty-five percent of the living subalpine fir had a light infection, 47 percent moderate and 28 percent heavy. Fifty percent of the dead standing subalpine fir were apparently killed by broom rust.

Subalpine fir on State forest lands near Swan Lake, Idaho, harbored heavy broom rust infections in residual trees even after the area had been cut for timber. Mortality of many of these heavily infected trees could occur before the next scheduled harvest.

Annosus Root Rot, *Fomitopsis annosa* Karst. *(Fomes annosus)*

A detection survey for annosus root rot conducted on old ponderosa pine sale areas and burns with adequate regeneration revealed many infection centers (Figure 5). The table below summarizes the findings.

Figure 5. Ponderosa pine killed by annosus root rot, Bureau of Land Management seed orchard, Idaho City, Idaho.

Area	Acres Surveyed	No. F.a. Centers Located	% Stumps Infected	Ave. No. Dead Trees/ Center	Ave. Size Infection Center (sq.ft.)
Holbrook Burn, Boise N.F.	10.5	11	8.0	3.09	277
Pyle Ck., Boise N.F.	13.5	8	10.0	1.25	463
BLM Seed Orchard, Boise N.F.	11.0	15	15.0	3.27	774
Pine Ck., Payette N.F.	3.6	2	0.56	2.50	191
Calf Pen, Payette N.F.	172.0	71	-	5.03	313

Shoestring Root Rot, *Armillariella mellea* (Vahl ex Fr.) Karst.

Three centers of shoestring root rot were associated with mortality of lodgepole pine in campgrounds on the Challis National Forest. The centers were detected during a survey for green hazardous trees in developed areas. Two of the centers were along boggy stream courses and all had either mountain pine beetle or pine engraver beetle associated with the mortality.

Rhabdocline Needle Cast, *Rhabdocline pseudotsugae* Syd.

Douglas-fir displayed heavy infection of first year needles in southwestern Idaho. The Adams Creek drainage on the Weiser Ranger District, Payette National Forest, and Swanholm Creek drainage on the Boise Ranger District, Boise National Forest, contained particularly heavy infections. Resistance to infection varies by tree. Some individuals show a history of severe infection by lack of needle retention while other individuals show little effect.

Stalactiforme Canker, *Peridermium stalactiforme* A. and K.

Lodgepole pine in campgrounds along the Loon Creek drainage, Yankee Fork Ranger District, Challis National Forest, showed numerous stalactiforme cankers. Some trees contained as many as three cankers which spiraled around the stem for up to 22 feet.

An Unknown Needle Cast of Ponderosa Pine.

Gray needles hanging from ponderosa pine have become more apparent in recent years throughout southwest Idaho. All sizes of ponderosa are affected but mortality has been confined to sapling-sized trees. Further investigation is planned.

Dutch Elm Disease, *Ceratocystis ulmi*(Buisman) C. Moreau.

This disease was not reported from any new locations in 1976. The disease has previously been detected in Ada, Canyon and Payette Counties in Idaho.

Pollution Damage

Broad-leafed and conifer vegetation around the Navajo Generating Station at Page, Arizona was examined for damage caused by release of SO_2 gas. No damage attributed to the effects of SO_2 has been found following two and one-half years of exposure. No additional monitoring will be conducted unless damage is reported. Color photographs of all plant species are on file.

A Stem Canker, *Cytospora* sp.

Two areas of dying white fir on the Escalante Ranger District, Dixie National Forest, were revisited. Mortality caused by a species of *Cytospora* is continuing. Twenty-five years of yearly precipitation records were analyzed to determine if the mortality might be drought related. A rather tenuous long-term precipitation deficiency seems to be emerging from the graphic representations of snowpack water content. Further analyses are planned.

DISTRIBUTION OF MAJOR FOREST INSECT INFESTATIONS IN REGION 4*

1976

LEGEND

- *Mountain Pine Beetle*
- *Douglas-fir Beetle*
- *Engelmann Spruce Beetle*
- *Western Spruce Budworm*
- *Douglas-fir Tussock Moth*

Based on aerial and ground surveys

STATE AND PRIVATE FORESTRY

FOREST SERVICE

U. S. DEPARTMENT OF AGRICULTURE

SCALE

miles

0 40

*Recent reorganization has resulted in numerous boundary changes which are not shown on this map. In addition portions or several National Forests were not flown.

RELIEF MAP
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